

(No Model.)

2 Sheets—Sheet 1.

C. QVARNSTRÖM.
APPARATUS FOR BURNING LIQUID FUEL.

No. 390,036.

Patented Sept. 25, 1888.

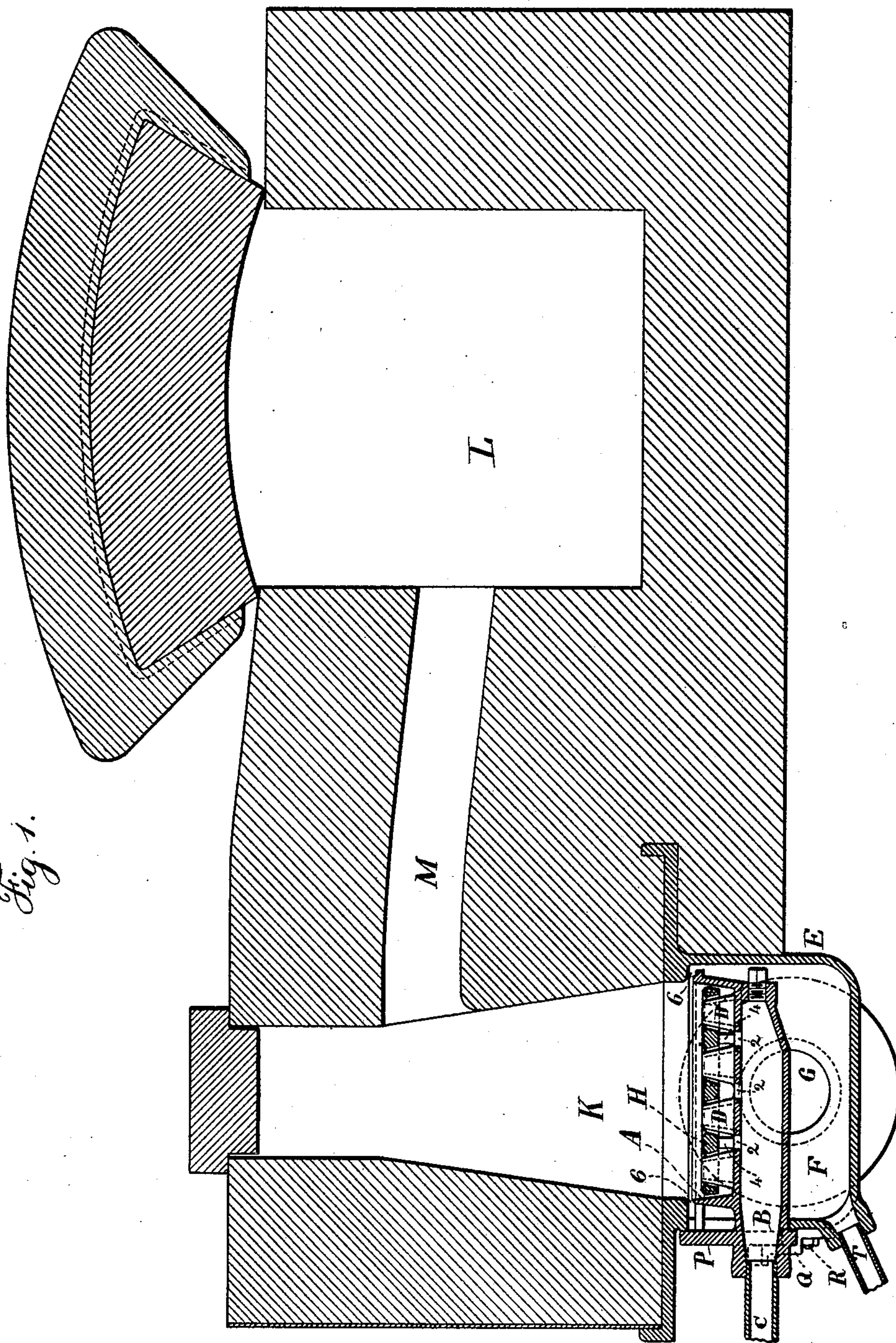


Fig. 1.

Witnesses:
J. Stait
Chas. H. Smith

Inventor:
Carl Qvarnstrom
per Lemuel W. Serrell atty.

(No Model.)

2 Sheets—Sheet 2.

C. QVARNSTRÖM.
APPARATUS FOR BURNING LIQUID FUEL.

No. 390,036.

Patented Sept. 25, 1888.

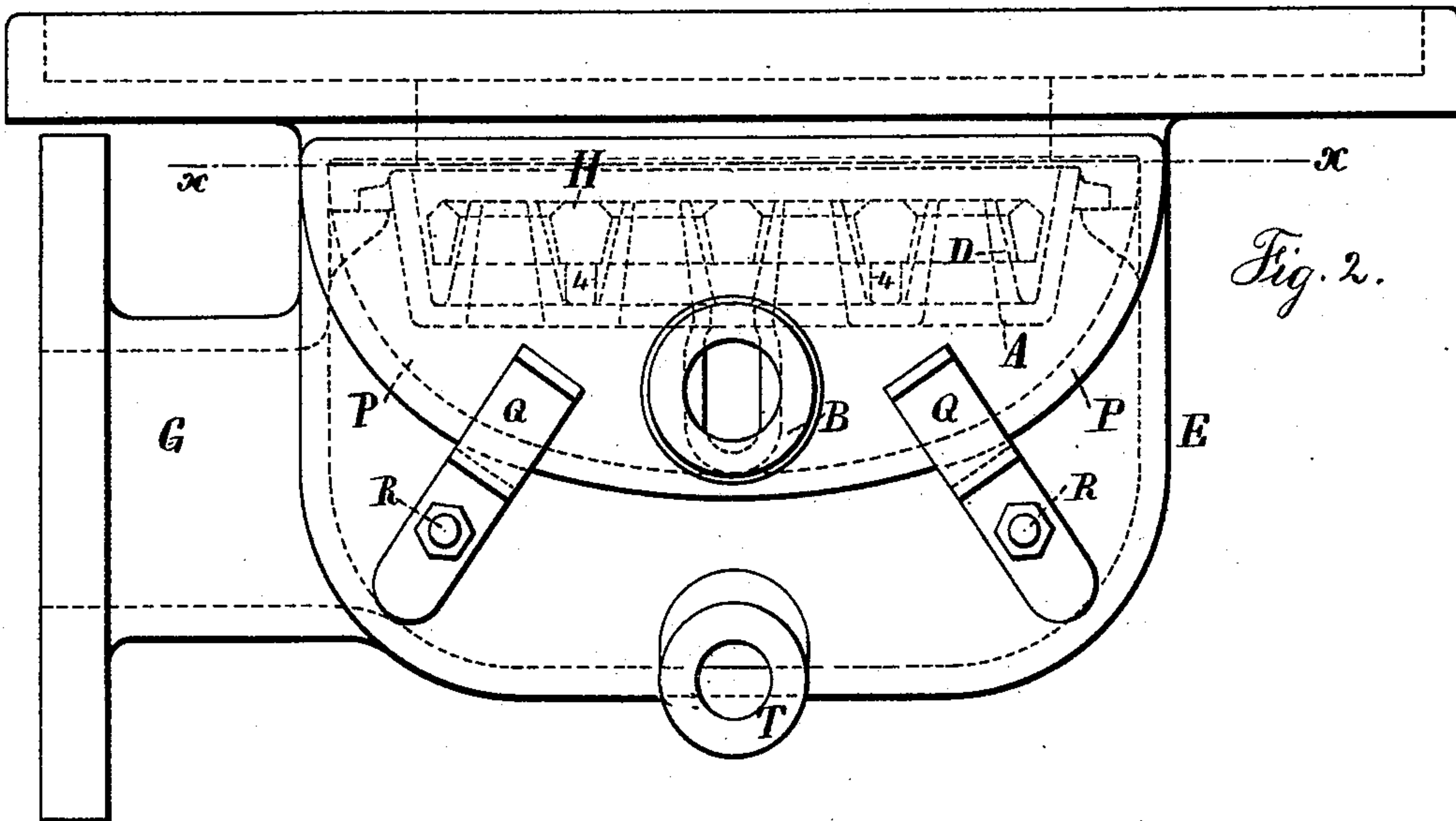
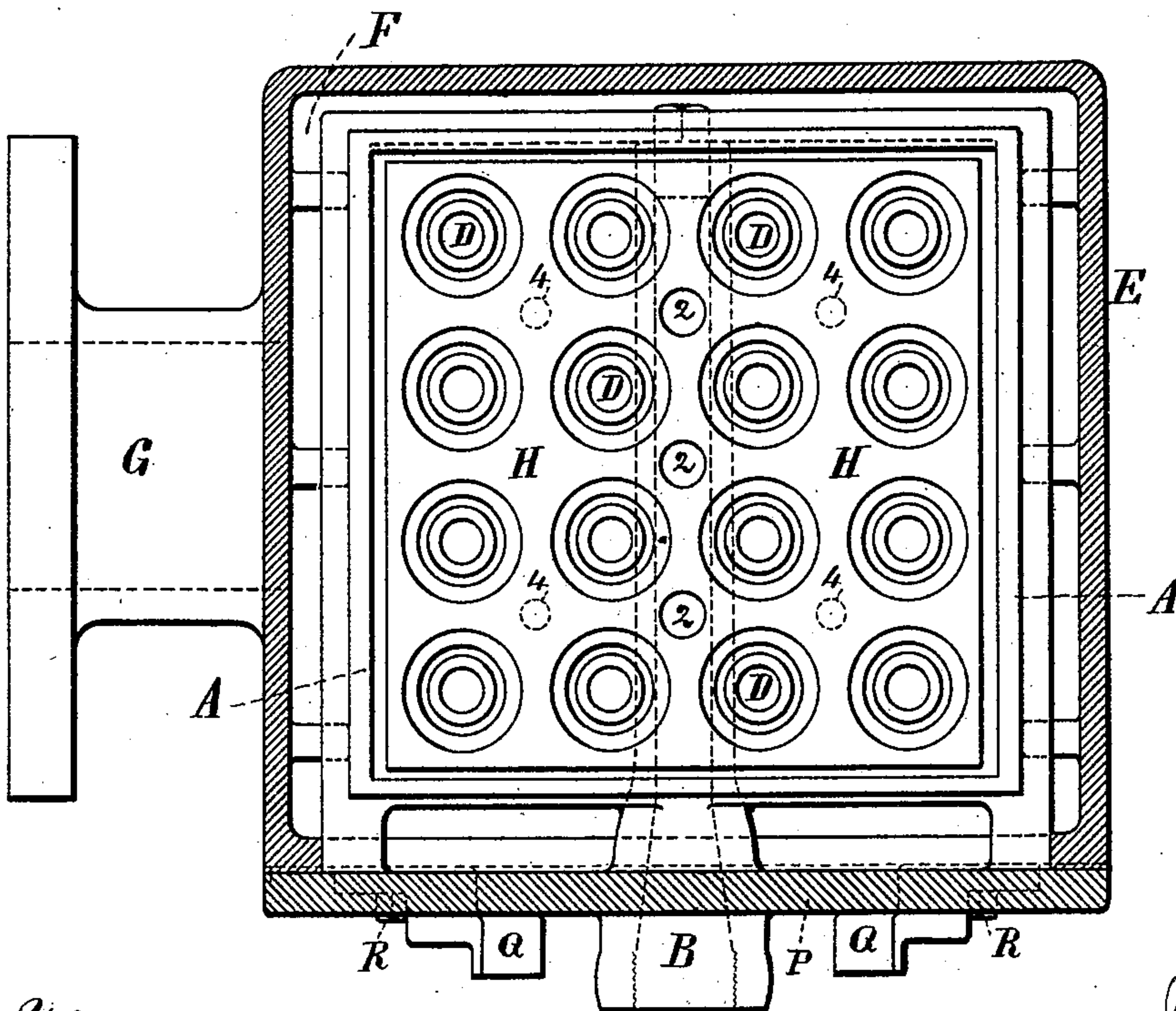


Fig. 2.

Fig. 3.



Witnesses:
J. Stail
Chas. H. Smith

Inventor:
Carl Qvarnstrom
per Lemuel W. Terrell atty.

UNITED STATES PATENT OFFICE.

CARL QVARNSTRÖM, OF TJORNEJ GOROD, BAKU, RUSSIA, ASSIGNOR TO
MELKER FREDRIK RYDEN, OF LONDON, ENGLAND.

APPARATUS FOR BURNING LIQUID FUEL.

SPECIFICATION forming part of Letters Patent No. 390,036, dated September 25, 1888

Application filed January 18, 1888. Serial No. 261,135. (No model.)

To all whom it may concern:

Be it known that I, CARL QVARNSTRÖM, of Tjornej Gorod, Baku, in the Empire of Russia, have invented an Improvement in Apparatus
5 for Burning Liquid Fuel, of which the following is a specification.

This improvement is especially intended for burning petroleum or other hydrocarbon liquid with an intense flame adapted to heating
10 steam-boilers, or for forges or furnaces for heating or smelting metals, or other purposes.

The liquid hydrocarbon is introduced by a tube below a pan into which such liquid rises, and there are open conical nipples passing up
15 through the bottom of the pan, so that atmospheric air under pressure from a chamber below the pan can pass up through these nipples and produce an intense flame by the burning of such liquid hydrocarbon, and the
20 flame is conveyed away through the flue to the hearth upon which the heating or melting operation is performed, or to the boiler; and I make use of a metallic grating within the pan containing the oil, there being annu-
25 lar openings between the grating and the air-nipples, so that the petroleum or the gases therefrom will pass through these annular openings and come into immediate contact with the blast of atmospheric air and burn
30 with an intense flame.

In the drawings, Figure 1 is a vertical section of my improved apparatus. Fig. 2 is an elevation of the parts at the end where the petroleum is supplied, and Fig. 3 is a plan
35 view below the line *xx*.

The petroleum-pan A is preferably of cast-iron, having beneath the middle portion thereof an oil-supply pipe, B, with openings 2 through the bottom of the pan, and to one end
40 of this supply-pipe B the tube C is connected, having the proper valve or cock to regulate the flow of the oil, and such oil rises within the pan A to the proper regulated height.

Through the bottom of the pan A are the
45 openings of the hollow conical nipples D, cast with such pan and placed at suitable distances apart, and the pan A is within the inclosure E, usually of cast-iron, that forms the air-chamber F, to which air under pressure is
50 supplied by the pipe G and suitable blowing apparatus. Within the pan A is a grating,

H, supported upon the studs 4 upon the bottom of the pan A, and this grating H is perforated with conical holes corresponding to the conical nipples D, but slightly larger, so
55 that there will be an annular space around each conical nipple, and the petroleum or other liquid hydrocarbon is allowed to rise within the pan A until it reaches the top of the grating H. 60

There is a narrow opening around the top edge of the pan A at 6, so that air will pass in laterally through the same from the chamber F and promote a perfect combustion of the hydrocarbon, and also act to keep the
65 flame away from the metal frame.

The oil is to be ignited, and the air blown into the flame through the nipples D and openings 6 causes a very perfect and rapid combustion in the chamber K, so that an intense heat
70 passes out of the flue M into the heating-chamber L, and the same is to be applied to any desired purpose—such, for instance, as heating boilers or metals or melting metals upon a hearth or in crucibles, the heating-chamber
75 being of suitable construction for the given object.

It is usually preferable to make a flange, P, around the oil-pipe B and cast in one with said oil-pipe and with the pan A, and which flange
80 extends laterally to cover the opening in the side of the vessel E, which opening is sufficiently large to allow for the insertion or withdrawal of the pan A and oil-pipe B, and the clamps Q and bolts R serve to hold this flange
85 P tightly against the end of the vessel E, so that the pan A can be removed by loosening said bolts and turning the clamps Q. In case the supply of oil is too great, the surplus will
90 overflow and run down the nipples D into the air-chamber F, and from thence by the pipe T to any suitable vessel.

The liquid fuel burns much more rapidly than coal, and the more intimate and rapid combination of the oxygen with the carbon
95 causes the flame itself to be more intense than with coal; hence the heating effect of the flame is greater and more rapid and the article acted upon can be melted more perfectly because the flame is much hotter than the melted materials,
100 and welds can be more perfectly made than with coal fires, there being no cinders, ashes, or

foreign substances present to adhere to the metal.

I claim as my invention—

1. The combination, in an apparatus for
5 burning liquid fuel, of a vessel or inclosure, E,
of metal, having closed sides and lower end
and forming an air-chamber, and having an in-
let air-pipe, G, connected therewith, through
10 which air under pressure can be forced, a cast-
iron pan, A, within the vessel, an oil supply
pipe, B, opening into the pan, and a supply-
tube, C, connected with the pipe B, the conical
nipples D, formed with the pan A and rising
15 from the bottom of the same, and a grating, H,
supported within the pan, said grating being
perforated with conical holes corresponding to
the nipples and surrounding the same, sub-
stantially as specified.

2. The combination, in an apparatus for
20 burning liquid fuel, of a vessel or inclosure, E,
forming an air-chamber, F, and the air-supply
pipe G, connected with said vessel, the pan A,
the oil-supply pipe B, and the flange P, formed
in one of cast metal, the pan and pipe being
25 adapted to be received within the vessel E and
be supported by the same, the supply-pipe C,
for conveying liquid fuel to the pipe B, there
being openings from the pipe B into the pan
A, and the grating H within said pan, sub-
30 stantially as specified.

3. The combination, in an apparatus for
burning liquid fuel, of a vessel or inclosure, E,
forming the air-chamber, the air-supply pipe
G and the oil-drain pipe T, connected there-
35 with, the cast-iron pan A, conical nipples D,
oil-supply pipe B, and flange P, in one piece
of cast metal, the pan and pipe being adapted to

be removably set into an opening at one side
of the vessel E and to be supported by said
vessel E, the supply-pipe C for liquid fuel, the
40 grating H, supported within the pan, said grat-
ing being formed with conical holes corre-
sponding to the nipples D, but of greater di-
ameter, so as to form intervening annular
spaces, there being an opening at 6 around the
45 edge of the pan A, and between the same and
the metal frame of the vessel E, whereby air
is admitted from the vessel E through the nip-
ples D and through the opening at 6, substan-
tially as and for the purposes set forth. 50

4. The combination, in an apparatus for
burning liquid fuel, of a vessel or inclosure, E,
forming an air-chamber, F, and the air-supply
pipe G, connected with said vessel, the pan A,
the oil supply pipe B, extending across be- 55
neath the pan, and the flange P, formed in one
of cast metal, and the pan and pipe being
adapted to be received within the vessel E and
be supported by the same, and the clamps Q
and the bolts R, connected to the vessel E, for 60
holding the flange P in place against the end
of the vessel E, the supply-pipe C, for con-
veying liquid fuel to the pipe B, there being
openings 2 from the pipe B into the pan A,
and the grating H within said pan, substan- 65
tially as specified.

In witness whereof I have hereunto set my
hand and seal the 18th day of February, 1887.

CARL QVARNSTRÖM. [L. S.]

Witnesses:

FREDRIK HELSINGËNS,
C. LENNART RYANDER,
Both of Baku, Russia.